

Notice of Allowability

Application No.

09/015,287

Examiner

John S. Chu

Applicant(s)

NOZAKI ET AL.

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 7/21/04.
2. ☒ The allowed claim(s) is/are 1-18 and 20-28.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

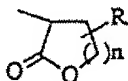
1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

John S. Chu
Primary Examiner
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REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance: The claimed invention is drawn to the following:

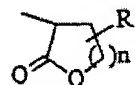
1. An acid-sensitive polymer compound, comprising:
 - a film-forming polymer;
 - a carboxyl group bonding to a side chain of said polymer main chain, said carboxyl group having a protective group; and
 - an additional acidic functional group bonding to a side chain of said polymer main chain, said acidic functional group having an acid-cleavable protective group;said carboxyl group having, as said protective group, a lactone structure represented by a formula



wherein n is an integer of 1 - 4, and R represents any of a hydrogen atom, an alkyl group, an alkoxyl group or an alkoxycarbonyl group and bonding to an arbitrary position of said lactone structure excluding a second position forming an ester bonding.

8. A resist composition, comprising:
 - an acid-sensitive film-forming polymer insoluble to an alkaline solution; a carboxyl group bonding to a side chain of said polymer's main chain, said carboxyl group having a protective group; and an additional acidic functional group bonding to a side chain of said polymer main chain, said acidic functional group having an acid-cleavable protective group; said carboxyl group having, as said protective group, a lactone structure represented by a formula

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wherein n is an integer of 1 - 4, and R represents any of a hydrogen atom, an alkyl group, an alkoxy group or an alkoxycarbonyl group and bonding to an arbitrary position of said lactone structure excluding a second position forming an ester bonding; and

a photoacid generator causing a decomposition in response to an absorption of a radiation, said photoacid generator releasing an acid that causes a deprotection of said acid-cleavable protective group in response to said decomposition;

said resist composition becoming soluble to said alkaline solution after said acid-cleavable protective group has caused said deprotection.

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18 (original): A method of forming a resist pattern, comprising the steps of:

applying a resist composition on a substrate to form a resist film, said resist composition comprising:

an acid-sensitive polymer compound insoluble to an alkaline solution, said acid-sensitive polymer compound comprising a film-forming polymer; a carboxyl group bonding to a side chain of said polymer main chain, said carboxyl group having a protective group; and an additional acidic functional group bonding to a side chain of said polymer main chain, said acidic functional group having an acid-cleavable protective group; said carboxyl group having, as said protective group, a lactone structure represented by a formula



wherein n is an integer of 1 - 4, and R represents any of a hydrogen atom, an alkyl group, an alkoxy group and an alkoxycarbonyl group and bonding to an arbitrary position of said lactone structure excluding a second position forming an ester bonding; and

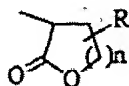
a photoacid generator causing a decomposition in response to an absorption of a radiation, said photoacid generator releasing an acid that causes a deprotection of said acid-cleavable

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Claim 24 (new): A method of fabricating a semiconductor device, comprising the steps of:

applying a resist composition on a substrate to form a resist film, said resist composition comprising:

an acid-sensitive polymer compound insoluble to an alkaline solution, said acid-sensitive polymer compound comprising a film-forming polymer; a carboxyl group bonding to a side chain of said polymer main chain, said carboxyl group having a protective group; and an additional acidic functional group bonding to a side chain of said polymer main chain, said acidic functional group having an acid-cleavable protective group; said carboxyl group having, as said protective group, a lactone structure represented by formula



wherein n is an integer of 1-4, and R represents any of a hydrogen atom, an alkyl group, an alkoxyl group or an alkoxycarbonyl group and connected to an arbitrary position of said lactone structure excluding a second position forming an ester bonding; and

a photoacid generator causing a decomposition in response to an absorption of a radiation, said photoacid generator releasing an acid that causes a deprotection of said acid-cleavable protective group in response to said decomposition;

Applicants have cancelled previous claim 19, and have rewritten the same method and inserted the limitations to a “method of fabricating a semiconductor device,”.

Support for the amendment to the preamble is found on page 28, lines 10-37. Applicants state that the method of claim 19 should have recited the method as now claimed. The examiner relies on the previous “REASONS FOR ALLOWANCE” as mailed April 21, 2004, because the inventive step to the composition having the particularly claimed 2-hydroxy-alkylolactone group in a polymer remains the same as the inventive step. The

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claims 24-28 are also allowable, wherein a method of using a novel and non-obvious invention is also allowable.

Because none of the prior art references of record disclose the claimed acid polymer, the resist composition, the method of forming a pattern or the method of fabricating a semiconductor device, claims 1-18, 20-28 are seen as allowable and passed to issue.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

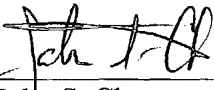
The fax phone number for the USPTO is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


John S. Chu
Primary Examiner, Group 1700

J.Chu
September 15, 2004